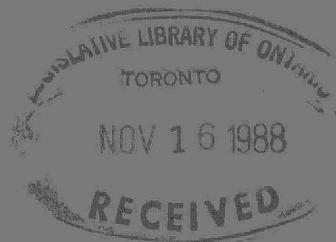


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LEAD CONCENTRATIONS IN SOIL
ON RESIDENTIAL, PUBLIC AND PUBLICLY
ACCESSIBLE COMMERCIAL PROPERTIES
IN THE VICINITY OF
TONOLLI COMPANY OF CANADA LTD.,
MISSISSAUGA - 1987

JULY 1988



Environment
Ontario

Jim Bradley
Minister

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**Lead Concentrations in Soil on Residential, Public and Publicly
Accessible Commercial Properties in the Vicinity of
Tonolli Company of Canada Ltd., Mississauga - 1987**

Phytotoxicology Section

Air Resources Branch

ARB No.: ARB-095-88-Phyto

Date : July, 1988

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Concentrations de plomb dans le sol de lieux résidentiels, de lieux publics et de lieux accessibles au public situés à proximité de la Tonolli Company of Canada Ltd., Mississauga, 1987.

Le ministère de l'Environnement a commencé ou annoncé la mise en oeuvre de programmes de remplacement du sol de propriétés résidentielles situées à proximité de deux affineries de plomb de Toronto. La concentration maximale admissible de plomb dans le sol est de 500 $\mu\text{g/g}$ (poids sec).

Une affinerie est également en activité dans les environs de l'intersection Dixie Road et Queensway, à Mississauga. Les émissions continues de plomb provenant de Tonolli Company of Canada Ltd. ont provoqué une présence élevée de ce métal dans le sol qui entoure l'affinerie. Les émissions provenant d'une autre usine, celle d'Exide, un fabricant de batteries qui a cessé ses activités en mai 1986, ont également contribué au dépôt de plomb dans le sol. Cependant, étant donné la contribution relativement mineure de l'ancienne usine d'Exide, ce rapport traitera uniquement de la source actuelle de pollution, la Tonolli Company of Canada Ltd.

À la demande des résidents locaux et des autorités du service d'hygiène publique de la région de Peel, le personnel de la Section de phytotoxicologie a recueilli, de mai à juillet, puis d'octobre à décembre 1987, des échantillons de sol d'un certain nombre de lieux résidentiels, de lieux publics et de lieux commerciaux et industriels accessibles au public.

Les analyses effectuées précédemment par la Section de phytotoxicologie (1980 et 1985) avaient révélé l'étendue de la pollution. Le programme d'échantillonnage de 1987 permet de mieux circonscrire la zone polluée. Les responsables du Ministère, les autorités de l'Hygiène publique et les résidents du secteur doivent discuter de la décision à prendre au sujet de l'enlèvement du sol. Le présent rapport fait le point sur les échantillons recueillis à proximité de l'usine Tonolli en 1987. On y mentionne également les données à ce sujet qui ont déjà paru dans deux rapports distincts (ARB-171-87-Phyto et ARB-197-87-Phyto).

Constatations

1. Sur les 296 propriétés résidentielles (850 sites) soumises à échantillonnage, 74 (154 sites) avaient une concentration de plomb dans le sol (quelle que soit la profondeur) égale ou supérieure à 500 $\mu\text{g/g}$.
2. Sur les 95 lieux publics et lieux industriels et commerciaux accessibles au public, 51 avaient une concentration de plomb dans le sol (quelle que soit la profondeur) égale ou supérieure à 500 $\mu\text{g/g}$; dans 40 autres, la concentration atteignait ou dépassait 1 000 $\mu\text{g/g}$.
3. La pollution du sol par le plomb diminuait considérablement avec la profondeur quand on descendait de 0-5 cm à 15-20 cm. Pour 86 échantillons de sites résidentiels recueillis à 15-20 cm de profondeur, la moyenne s'établissait à 113 $\mu\text{g/g}$, par rapport à 599 $\mu\text{g/g}$ à 0-5 cm.
4. La carte des concentrations de plomb dans le sol indiquait que la zone polluée ($> 500 \mu\text{g/g}$ de plomb dans le sol) est une zone de forme elliptique qui mesure environ 700 m de diamètre du nord au sud et 1 000 m de diamètre de l'est à l'ouest. La zone regroupe environ 70 propriétés d'habitation, situées pour la plupart au sud-est et, dans une moindre mesure, au sud-ouest de l'intersection Queensway et Dixie Road.

Lead Concentrations in Soil on Residential, Public and
Publicly Accessible Commercial Properties in the Vicinity of
Tonolli Company of Canada Ltd., Mississauga, 1987

Introduction

The Ministry of the Environment has soil removal programs underway, or announced, for residential properties in the vicinity of two Toronto secondary lead smelters. The soil replacement guideline for these programs is 500 $\mu\text{g/g}$ lead on a dry weight basis.

A secondary lead smelter also exists in the Dixie Road/Queensway area of Mississauga. Historical emissions of lead from Tonolli Company of Canada Ltd. have contributed to elevated soil lead concentrations in the vicinity of the smelter. Emissions from another source of lead in this area, the Exide plant, a battery manufacturer which ceased operations in May, 1986 also have contributed to the historical deposition of lead in soil. However, in view of the comparatively minor contribution from the former Exide plant this report will refer only to the existing source, the Tonolli Company of Canada Ltd.

In response to requests from local residents and Peel Region Public Health Department authorities, staff from the Phytotoxicology Section conducted soil sampling on a number of residential, public and publicly accessible commercial/industrial sites from May to July and from October to December, 1987. Previous Phytotoxicology Section assessment surveys (1980 and 1985) gave an indication of the extent of soil contamination. The 1987 sampling program allows a more precise determination of the area of concern. A decision regarding soil removal is pending further discussion among Ministry officials, Public Health authorities and residents of the area. This report will serve as a final summation of all soil sampling for lead analysis in the vicinity of the Tonolli plant in 1987. This includes soil lead data previously released in 2 separate reports (ARB-171-87-Phyto and ARB-197-87-Phyto).

Methods

Sampling in October-December, 1987 was conducted on all residential properties which lay within the 500 $\mu\text{g/g}$ soil lead concentration contour obtained from the 1985 Phytotoxicology Section soil assessment survey. Many additional residential properties south and east of the above-mentioned area were sampled earlier in 1987 in response to requests from area residents. The sampling area is shown in Figure 1.

The total number of residential properties sampled was 296 while the total number of sampling sites on these properties was 850. Boulevards fronting residential properties were considered residential sites. Boulevards were sampled on a representative basis, i.e. boulevard samples were not collected at every address. Additionally, a total of 95 sites were sampled on public and publicly accessible commercial/industrial property (Fig. 2). Public properties sampled included boulevards not fronting residential properties, a school yard, Hydro rights-of-way and a GO train station. Publicly accessible commercial/industrial areas sampled included lawns, vacant grassed fields, narrow soil strips and a cultivated field.

In all cases soil sampling was conducted using standard Phytotoxicology Section techniques. Usual sampling depth was 0-5 cm; this depth is generally used for lawns and other uncultivated areas. Shallower sampling (0-2 cm) was required at a few sites where packed and/or very coarse soil was encountered (e.g., on driveways). A sampling depth of 0-15 cm was used for gardens and other cultivated areas. Two separate samples were collected at each site (duplicate sampling) and the results were averaged. Typical residential sampling sites could include a front lawn, front boulevard, back lawn, back vegetable garden, flower bed (if of substantial size), and children's play area (e.g., sandbox). Periodically, a sampling depth of 15-20 cm also was

used to assess the extent of sub-surface soil lead contamination. This sampling depth was used on 86 residential property sites and 13 commercial/industrial/public sites, one sample only per site. In order to minimize contamination from peeling paint, soil cores were not collected closer than 0.5 m from painted exterior surfaces.

All samples were air dried and sieved to 0.35 mm particle size, and were analyzed for lead at the MOE, Laboratory Services Branch.

Results

Table 1 presents results of the 1987 soil lead sampling program on residential properties in the vicinity of the Tonolli plant, Mississauga. Table 2 gives results from public and publicly accessible commercial/industrial properties. Concentrations of lead in excess of 500 $\mu\text{g/g}$ are underlined in Table 1.

Of the 296 residential properties sampled, 74 (25%) had one or more sample sites with greater than, or equal to, 500 $\mu\text{g/g}$ lead in soil (any depth). For 11 of these 74 properties, the only site on the property showing greater than 500 $\mu\text{g/g}$ soil lead was a boulevard. The total number of residential sampling sites with greater than, or equal to, 500 $\mu\text{g/g}$ lead was 154 (18% of the 850 residential sites sampled). Sample sites include 0-5 cm, 0-15 cm and 0-2 cm sampling depths; 15-20 cm samples were considered as representing the same site as the associated 0-5 cm sample.

The maximum soil lead concentration measured for residential property samples was 2800 $\mu\text{g/g}$ (boulevard, Dixie Road). The second highest was 2500 $\mu\text{g/g}$ (front lawn, Dixie Road).

For the 95 public and publicly accessible commercial/industrial sites sampled, 51 (54%) had greater than 500 $\mu\text{g/g}$ lead in soil. Of these, 40 (42%) had a soil lead level greater than 1000 $\mu\text{g/g}$. The maximum soil

lead concentration measured on these properties was 39,000 $\mu\text{g/g}$ (boulevard on Dixie Road, east of Tonolli Company).

Results of the sub-surface (15-20 cm depth) sampling on both residential sites and public/commercial/industrial sites indicated that soil lead concentrations decreased substantially with increasing depth from 0-5 cm to 15-20 cm. For the 86, 15-20 cm residential site samples the mean value was 113 $\mu\text{g/g}$; the mean value for the 86 associated 0-5 cm samples was 599 $\mu\text{g/g}$. Similarly, for the 13, 15-20 cm public and publicly accessible commercial/industrial sites, the mean value was 186 $\mu\text{g/g}$; for the 13 associated 0-5 cm samples it was 2122 $\mu\text{g/g}$. In 98 out of 99 cases the soil lead concentration at 0-5 cm exceeded that of the associated 15-20 cm sample; for the exceptional case both values were very low.

Data obtained from the 1987 soil sampling program were used to construct computer-generated contour lines of surface soil lead concentrations in the vicinity of the Tonolli Company. Both 500 $\mu\text{g/g}$ and 1000 $\mu\text{g/g}$ contours are shown in Figure 3. These contours represent 'smoothed' results and should not be considered as exact delineations since soil lead concentrations exhibit considerable variability. The contour lines near Dixie Road south of Kendall Road were modified somewhat to better represent the available data in the area. Since soil lead concentrations in this area decrease rapidly with increasing distance away from Dixie Road, the 500 $\mu\text{g/g}$ and 1000 $\mu\text{g/g}$ contour lines appear to merge in the boulevard strip. Also, the contour lines were left open-ended at the south end of this area as no data were available further south to indicate otherwise. Elongation of the area of contamination south on Dixie Road, and to a lesser extent east and west on the Queensway (primarily boulevard contamination), appears to be due mainly to vehicular emissions.

Summary

1. Of the 296 residential properties (850 sites) sampled, 74 properties (154 sites) had soil lead concentrations (any depth) equal to or exceeding 500 $\mu\text{g/g}$.
2. Of the 95 public and publicly accessible commercial/industrial sites sampled, 51 had soil lead concentrations (any depth) equal to or exceeding 500 $\mu\text{g/g}$, while 40 sites equalled or exceeded 1000 $\mu\text{g/g}$ lead.
3. Soil lead contamination decreased substantially with increasing depth from 0-5 cm to 15-20 cm. For 86, 15-20 cm residential site samples the mean was 113 $\mu\text{g/g}$; the mean value for the 86 associated 0-5 cm samples was 599 $\mu\text{g/g}$.
4. Contour mapping of soil lead concentrations indicated that the contaminated area ($\geq 500 \mu\text{g/g}$ soil lead) consists of a roughly elliptical zone extending approximately 700 m in N-S diameter and 1000 m in E-W diameter. The zone includes approximately 70 residential properties, most lying southeast, and to a lesser extent southwest, of the Queensway - Dixie Road intersection.

RR/RE2405

TABLE 1

Soil Lead Concentrations ($\mu\text{g/g}$ dry weight) for Residential Properties
in the Vicinity of Tonolli Co. of Canada, Mississauga, 1987

STREET	FRONT YARD	BACK YARD	OTHER
Brentano Blvd.	lawn 175*	lawn 255 garden 175	
Brentano Blvd.	lawn 66	lawn 64 garden 87	
Brentano Blvd.	lawn 81	lawn 84 garden 140	
Brentano Blvd.	lawn 145	lawn 175	W planter 110 E planter 74
Carletta Dr.	lawn 205	lawn 235 sand box 12	
Carletta Dr.	lawn 255	lawn 185	W lawn 180
Carletta Dr.	W boulevard 315	E garden 185	
Carletta Dr.	lawn 102	lawn 165 garden 77	
Carletta Dr.	lawn 102	lawn 110 garden 66	
Carletta Dr.	lawn 200	lawn 124	
Carletta Dr.	lawn 125	lawn 125 garden 52 sand box 10	
Carletta Dr.	lawn 175	lawn 165 garden 90	
Courtland Cr.	lawn 130	garden 69	E lawn 115
Denise Rd.	lawn 210	lawn 185 bed 240	
Denise Rd.	lawn 210	lawn 130	
Denise Rd.	lawn 305	lawn 140	
Denise Rd.	bed 80		
Denise Rd.	lawn 110	lawn 195	
Denise Rd.	lawn 245	lawn 97 bed 60	
Denise Rd.	lawn 645*	lawn 430	
Denise Rd.	lawn 160	lawn 220 bed 215	
Denise Rd.	lawn 250	lawn 220	
Denise Rd.	lawn 165	lawn 135 garden 61	
Denise Rd.	lawn 205	lawn 245 bed 150 sand box 4	
Denise Rd.	lawn 140	lawn 145 garden 105	
Denise Rd.	lawn 190		
Denise Rd.	lawn 155		
Denise Rd.	boulevard 440		
Denise Rd.	lawn 195 (32)	lawn 175 (32)	
Denise Rd.	boulevard 280 (21)	garden 106	
Denise Rd.	lawn 86	lawn 125 garden 66	

TABLE 1 (cont'd)

STREET	FRONT YARD	BACK YARD	OTHER
Denise Rd.	N lawn 220 N boulevard 255	lawn 220	E side lawn 180
Denise Rd.	lawn 180	lawn 245	
Denise Rd.	lawn 130 (19) boulevard 300	lawn 375 (34)	
Denise Rd.	refused access		
Denise Rd.	lawn 285	lawn 390	
Denise Rd.	boulevard <u>500</u> (38)		
Denise Rd.	lawn 385	lawn <u>500</u>	
Denise Rd.	boulevard <u>595</u>		
Denise Rd.	lawn ~ 480 (31) lawn 320	lawn 290 (73) lawn 305 garden 118	side lawn 400
Denise Rd.	lawn <u>510</u> boulevard <u>705</u> (21)		
Denise Rd.	lawn 410	lawn 320 garden 255	
Denise Rd.	lawn 445 (35) boulevard <u>785</u> (120)	lawn 480 (150)	
Denise Rd.	lawn 350		
Denise Rd.	lawn 475		side lawn 385 (34)
Denise Rd.	boulevard <u>830</u> (23)		
Denise Rd.	lawn 355	lawn 390 garden 175	
Denise Rd.	lawn 490	lawn 425 garden 235	
Denise Rd.	lawn <u>1050</u>	lawn 395 garden 200	
Denise Rd.	lawn 540	lawn 490	
Denise Rd.	lawn <u>930</u> (20)	lawn <u>605</u> (40)	
Denise Rd.	boulevard <u>1600</u> (29)	garden 260	
Denise Rd.	lawn 410 (140)	lawn 430 (100)	
Denise Rd.	boulevard <u>710</u>		
Denise Rd.	lawn <u>960</u>	lawn <u>520</u> garden 315	
Denise Rd.	bed 66		
Denise Rd.	lawn <u>515</u>		
Denise Rd.	boulevard <u>835</u>		
Denise Rd.	lawn 575	lawn 690	
Denise Rd.	lawn <u>550</u> (61)	lawn 102	
Denise Rd.	lawn 240		
Denise Rd.	lawn <u>690</u> (210 @ 13-18 cm)	lawn 475	
Denise Rd.	(140 @ 25-30 cm)		
Denise Rd.	boulevard <u>1350</u> (61)		
Denise Rd.	lawn <u>535</u> (180)	lawn <u>675</u> (210)	
Denise Rd.	lawn <u>625</u>	lawn 410	
Denise Rd.	lawn <u>940</u>	garden 320	
Denise Rd.	lawn <u>630</u>	lawn 740	
Denise Rd.	lawn <u>950</u> boulevard <u>1600</u>	lawn 425	
Denise Rd.	lawn ~ 490 (150)	garden 350	
Denise Rd.	boulevard <u>1050</u>	lawn <u>860</u>	
		lawn 470 (230)	
		garden 285	

TABLE 1 (cont'd)

STREET	FRONT YARD	BACK YARD	OTHER
Denise Rd.	lawn <u>990</u>	lawn <u>1050</u> bed <u>910</u>	
Denise Rd.	lawn <u>680</u>	lawn <u>450</u> garden <u>315</u>	
Denise Rd.	lawn <u>730</u> (250)	lawn <u>965</u> (420) garden <u>760</u>	
Denise Rd.	lawn <u>820</u> boulevard <u>565</u> (110)	lawn <u>475</u> garden <u>455</u>	
Denise Rd.	lawn <u>890</u>	lawn <u>1200</u>	
Denise Rd.	lawn <u>865</u>	lawn <u>1500</u>	
Denise Rd.	lawn <u>680</u>	lawn <u>455</u>	side boulevard <u>1250</u> side lawn <u>760</u> (120) side garden <u>385</u>
Denise Rd.	lawn <u>740</u> (360)	lawn <u>1800</u> (480) garden <u>930</u>	
Denise Rd.	lawn <u>445</u>	lawn <u>2,200</u> garden <u>885</u>	
Denise Rd.	lawn <u>330</u>	lawn ⁿ <u>220</u> lawn ^o <u>715</u> garden ^o <u>985</u>	
Denise Rd.	lawn <u>995</u> (450)	lawn <u>470</u> (410)	
Denise Rd.	lawn <u>830</u>	lawn <u>680</u>	
Denise Rd.	lawn <u>655</u>	lawn <u>530</u> (170) garden <u>500</u>	
Denise Rd.	lawn <u>1200</u>		
Denise Rd.	lawn <u>610</u>	lawn <u>500</u>	side lawn <u>645</u>
Denise Rd.	lawn <u>655</u>	lawn <u>570</u> garden <u>345</u>	
Denise Rd.	lawn <u>720</u>	lawn <u>~480</u>	side lawn <u>630</u>
Denise Rd.	lawn <u>490</u> (76)		
Denise Rd.	boulevard <u>690</u>		
Denise Rd.	lawn <u>620</u>	lawn <u>230</u>	side lawn <u>515</u> (140)
Denise Rd.	boulevard <u>900</u> (140)		
Denise Rd.	lawn <u>635</u>	lawn <u>325</u>	
Dixie Rd.	lawn <u>210</u>	lawn <u>190</u> garden <u>125</u>	
Dixie Rd.	lawn <u>125</u>	lawn <u>125</u>	
Dixie Rd.	lawn <u>200</u>	lawn <u>125</u> garden <u>75</u>	
Dixie Rd.	lawn <u>320</u>		side lawn <u>300</u> (45)
Dixie Rd.	boulevard <u>735</u>		
Dixie Rd.	lawn <u>620</u>	W lawn <u>575</u> E lawn <u>485</u>	
Dixie Rd.	boulevard <u>825</u>	lawn <u>290</u>	S side lawn <u>325</u>
Dixie Rd.	boulevard <u>2800</u>	N lawn <u>255</u>	N grassed strip <u>670</u> NE grassed strip <u>845</u>
Dixie Rd.	lawn <u>1350</u>	lawn <u>~490</u> (57)	E orchard <u>440</u>
Dixie Rd.	boulevard <u>530</u>	garden <u>150</u>	W orchard <u>355</u>
Dixie Rd.	boulevard <u>1450</u>	lawn <u>655</u> garden <u>560</u>	side ditch <u>530</u> drive <u>385</u> (0-2 cm) corner boulevard <u>455</u> S boulevard <u>415</u> side lawn <u>830</u>

TABLE 1 (cont'd)

STREET	FRONT YARD	BACK YARD	OTHER
Dixie Rd.	lawn 600 boulevard 2500(250)	lawn 1000 garden @ } 705 garage }	side garden 515
Dixie Rd.	lawn 620	lawn 660 vineyard 665	S side lawn 825 (52) N side lawn 1250(56)
Dixie Rd.	lawn 795	lawn 655	S side lawn 810
Dixie Rd.	lawn 810 (350)	garden 330 lawn 1350 (95) SE garden 680	N side lawn 795(75) S side lawn 1450
Dixie Rd.	lawn 905 (S end) lawn 680 (N end)		side lawn 595
Dixie Rd.	lawn 2500 (270)	lawn 665	side garden 525
Dixie Rd.	lawn 1250	lawn 1650 (130)	drive 830 (0-2 cm)
Family Cres.	lawn 155	lawn 145	
Family Cres.	lawn 180	lawn 210	
Family Cres.	lawn 125	bed 72	
Family Cres.	lawn 155	lawn 52 garden 71	
Family Cres.	lawn 165	lawn 155 garden 165	
Family Cres.	lawn 145	lawn 220	
Family Cres.	lawn 160	bed 160	
Feldwood Rd.	lawn 110	lawn 88 garden 57	
Feldwood Rd.	lawn 160	lawn 185	
Feldwood Rd.	lawn 225	bed 88	
Feldwood Rd.	lawn 103	lawn 94	
Feldwood Rd.	lawn 140	lawn 114 garden 110	
Feldwood Rd.	lawn 97	lawn 88 garden 57	
Feldwood Rd.	lawn 140	lawn 105 garden 54	
Feldwood Rd.	lawn 265	lawn 255 garden 225	
Greenhurst Ave.	lawn 108		side lawn 105
Greenhurst Ave.	lawn 120	lawn 135 bed 85	side garden 76
Greenhurst Ave.	lawn 205	lawn 65 bed 68	
Greenhurst Ave.	lawn 150	lawn 115 bed 130	
Greenhurst Ave.	lawn 140	lawn 145	
Greenhurst Ave.	lawn 160	lawn 175 garden 91	
Greenhurst Ave.	lawn 130	lawn 160	side bed 145

TABLE 1 (cont'd)

STREET	FRONT YARD	BACK YARD	OTHER
Greenhurst Ave.	lawn 130	lawn 180	
Greenhurst Ave.	lawn 120	lawn 150	
Greenhurst Ave.		garden 90	
Greenhurst Ave.	lawn 130	lawn 155	
Greenhurst Ave.		garden 87	
Greenhurst Ave.	lawn 135	lawn 99	
Greenhurst Ave.		bed 59	
Greenhurst Ave.	lawn 195	lawn 110	
Greenhurst Ave.	lawn 120	lawn 96	
Greenhurst Ave.		garden 44	
Greenhurst Ave.	lawn 110	lawn 86	
Greenhurst Ave.		garden 54	
Greenhurst Ave.	lawn 88	lawn 93	
Greenhurst Ave.		garden 60	
Greenhurst Ave.	lawn 180	lawn 70	
Greenhurst Ave.		bed 64	
Greenhurst Ave.	lawn 135	lawn 95	
Greenhurst Ave.	lawn 195	lawn 94	
Greenhurst Ave.	lawn 145	lawn 120	
Greenhurst Ave.		bed 84	
Greenhurst Ave.	lawn 64	lawn 105	
Greenhurst Ave.	lawn 105	bed 90	
Greenhurst Ave.	lawn 140	lawn 110	
Greenhurst Ave.	lawn 140	lawn 220	
Greenhurst Ave.	lawn 205	garden 130	
Greenhurst Ave.	lawn 165	lawn 52	
Greenhurst Ave.		garden 200	N side lawn 155 (6)
Greenhurst Ave.	lawn 115	lawn 92	N boulevard 235
Greenhurst Ave.	lawn 150	lawn 105	
Greenhurst Ave.		bed 210	
Greenhurst Ave.	lawn 160	lawn 100	
Greenhurst Ave.		garden 88	
Greenhurst Ave.	lawn 57	lawn 66	
Greenhurst Ave.	lawn 160	lawn 115	
		garden 66	
Harvest Dr.	lawn 250	lawn 115	
		garden 67	
Kalligan Ct.	lawn 95	lawn 100	
Kalligan Ct.	lawn 105	lawn 105	
Kalligan Ct.		garden 76	
Kalligan Ct.	lawn 73	lawn 98	
Kalligan Ct.		garden 80	
Kalligan Ct.	lawn 100	lawn 71	
Kalligan Ct.		bed 68	
Kalligan Ct.	lawn 92	lawn 99	
Kalligan Ct.		bed 73	
Kalligan Ct.	lawn 160	lawn 61	side bed 70
Kalligan Ct.	lawn 125	lawn 55	
Kalligan Ct.		garden 105	
	lawn 115		

TABLE 1 (cont'd)

STREET	FRONT YARD	BACK YARD	OTHER
Kalligan Ct.	lawn 195	lawn 135 garden 62	
Kalligan Ct.	lawn 120	lawn 115 garden 84	
Kalligan Ct.	lawn 140	lawn 205 bed 125	
Laughton Ave.	lawn 92	lawn 155 garden 83	
Laughton Ave.	lawn 210	lawn 180 bed 115	
Laughton Ave.	lawn 185	garden 50	side lawn 180
Melton Dr.	lawn 66		E lawn 66 W lawn 72
Melton Dr.	lawn 57	S lawn 91	
Melton Dr.	boulevard 110	garden 44	
Melton Dr.	lawn 105	lawn 92	
Melton Dr.	lawn 195	play area/ garden 60	
Melton Dr.	lawn 155	lawn 150 (100)	
Melton Dr.	lawn 160	lawn 165	
Melton Dr.	lawn 185 (22)	garden 115	
Melton Dr.	lawn 270	lawn 165 (48)	
Melton Dr.	lawn 275	lawn 180 (34)	
Melton Dr.	lawn 230	lawn 345	
Melton Dr.	grassed ditch 270	lawn 325	
Melton Dr.	lawn 275 (76)	lawn lawn 245	
Melton Dr.	lawn 345	lawn 250 (33)	
Melton Dr.	lawn 295	lawn 260	
Melton Dr.	grassed ditch 175	lawn 305	
Melton Dr.	drive 300 (0-2 cm)		
Melton Dr.	lawn 55	lawn 51	
Nida Ct.	lawn 165	lawn 190 NW garden 175 S garden 67	S side lawn 160
Nida Ct.	lawn 125		
Nida Ct.	boulevard 175		side lawn 120
Nida Ct.	lawn 150	lawn 120	
Nida Ct.	boulevard 210		
Nida Ct.	lawn 215	lawn 195 (18) corner lawn 160 sand pit 18 garden 105	gravel driveway 765 (0-2 cm)
Nida Ct.	lawn 225 (36)	lawn 180 (67)	
Nida Ct.	boulevard 395		
Nida Ct.	lawn 170	lawn 155	side lawn 280
Pagehurst Ct.	lawn 44	lawn 26 garden 22	

TABLE 1 (cont'd)

STREET	FRONT YARD	BACK YARD	OTHER
Promenade Ct.	lawn 53	lawn 49 garden 43	
Promenade Ct.	lawn 70 boulevard 66	lawn 74	
Promenade Ct.	lawn 75	lawn 47 garden 58	
Promenade Ct.	lawn 93	lawn 50 garden 64	
Promenade Ct.	lawn 195	lawn 62 (69) garden 49	
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Proverbs Dr.	lawn 155	lawn 94 garden 160	
Proverbs Dr.	lawn 140	lawn 155 garden 120	
Proverbs Dr.	lawn 255	lawn 370 garden 205	
Proverbs Dr.	lawn 170	lawn 210 garden 210	
Proverbs Dr.	lawn 305	lawn 295 garden 150	
Proverbs Dr.	lawn 240	lawn 260	
Proverbs Dr.	lawn 270	lawn 285 garden 160	
Proverbs Dr.	lawn 135	lawn 110 garden 140	
Proverbs Dr.	lawn 295	lawn 295 garden 490	
Proverbs Dr.	lawn 120	lawn 105	side bed 95
Proverbs Dr.	lawn 230	lawn 245 garden 260	
Proverbs Dr.	lawn 260		
Proverbs Dr.	lawn 155	lawn 130 garden 145	
Proverbs Dr.	lawn 240	lawn 92 garden 93	
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Safeway Cres.	lawn 190	lawn 175	garden 275
Safeway Cres.	lawn 265	lawn 260 garden 580	
Safeway Cres.	lawn 325	lawn 355	
Safeway Cres.	lawn 135	garden 160 lawn 145	
Safeway Cres.	lawn 265	garden 89 lawn 345	
Safeway Cres.	lawn 245 (175)	garden 290 lawn 295 (260)	
Safeway Cres.	lawn 365	W garden 225 E garden 190	
Safeway Cres.	lawn 375 boulevard ~480	lawn 290 garden 430 lawn 360 N garden 440 S garden 360	

TABLE 1 (cont'd)

STREET	FRONT YARD	BACK YARD	OTHER
Safeway Cres.	lawn 275	lawn 360 (230) N garden 345 S garden 370 lawn 290	
Safeway Cres.	lawn 310 boulevard <u>520</u>	N garden 335 S garden 340	
Safeway Cres.	lawn 375	lawn 445 garden 230	
Safeway Cres.	lawn 415	lawn 470	
Safeway Cres.	lawn 340	lawn <u>580</u>	
Safeway Cres.	lawn 280	lawn 305 garden 250	
Safeway Cres.	lawn 390	lawn <u>530</u> garden 290	
Safeway Cres.	lawn 355	lawn 395 garden 385	
Safeway Cres.	lawn 370	lawn 450 garden 315	
Safeway Cres.	lawn 385	lawn 420	
Safeway Cres.	lawn 270		
Safeway Cres.	lawn 250 (80) boulevard 150 (33)	lawn 315 (76)	
Safeway Cres.	lawn 170	lawn 345	
Safeway Cres.	lawn 250	bed 230	
Safeway Cres.	lawn 315	lawn 370 garden 345	
Safeway Cres.	lawn 260	lawn 365 garden 315	
Safeway Cres.	lawn 300	bed 145	
Safeway Cres.	lawn 210	lawn 200 garden 140	
Safeway Cres.	lawn 300	lawn 390 garden 220	
Safeway Cres.	lawn 125	lawn 155 garden 85	
Safeway Cres.	lawn 170	lawn 140	
Safeway Cres.	lawn 155	lawn 140 garden 120	
Sherway Dr.	lawn 125	lawn 175	
Sherway Dr.	lawn 215	garden 75 lawn 260 play area 150	
Sherway Dr.	lawn 140	garden 180 lawn 100	
Sherway Dr.	lawn 155	garden 140 lawn 185	
Sherway Dr.	lawn 235	garden 85	
Sherway Dr.	lawn 110	lawn 98	side lawn 200
Sherway Dr.	lawn 170	garden 72 lawn 175	
		garden 175	

TABLE 1 (cont'd)

STREET	FRONT YARD	BACK YARD	OTHER
Sherway Dr.	lawn 245		side lawn 140 garlic bed 140
Sherway Dr.	lawn 155 boulevard <u>590</u>	lawn 145	
Sherway Dr.	lawn 76	lawn 99 garden 150	
Sherway Dr.	lawn 58	lawn 31 bed 39	
Sherway Dr.	lawn 135	lawn 89 garden 110	
Sherway Dr.	lawn 47	lawn 75 garden 55	
Sherway Dr.	lawn 140	lawn 102	
Sherway Dr.	lawn 145	lawn 87 garden 135	
Sherway Dr.	lawn 135	lawn 95 garden 38	
Sherway Dr.	lawn 88	lawn 66 garden 65	
Sherway Dr.	lawn 42	lawn 38 garden 44	
Sherway Dr.	lawn 93		
Sherway Dr.	lawn 140	lawn 155 garden 135	
Sherway Dr.	lawn 98	lawn 93	
Sherway Dr.	lawn 70		
<hr/>			
Sidney Dr.	lawn 330 (86) S side/front 440	lawn 345 garden 160	N side lawn 455
Sidney Dr.	lawn 420 grassed ditch 205	lawn 460 garden 295	
Sidney Dr.	lawn 335	lawn 515	
Sidney Dr.	lawn <u>520</u> (150)	lawn <u>710</u> (220)	side lawn <u>2150</u>
Sidney Dr.	lawn <u>605</u> (130)	lawn <u>840</u> (210)	
Sidney Dr.	grassed ditch <u>600</u>		
Sidney Dr.	lawn 360	lawn 620	N side lawn
Sidney Dr.	lawn <u>540</u>	lawn <u>620</u>	~475 (200) side garden 450
<hr/>			
Stanfield Rd.	lawn 47	lawn 110 garden 27	
<hr/>			
Sunnycove Dr.	lawn 210	lawn 175	
Sunnycove Dr.	lawn 240	garden 155 lawn 165	
Sunnycove Dr.	lawn 205	garden 155 lawn 180	
Sunnycove Dr.	lawn 215	garden 260 lawn 350	
Sunnycove Dr.	lawn 165	garden 290 lawn 220	
Sunnycove Dr.	lawn 350	lawn 340 garden 345	

TABLE 1 (cont'd)

STREET	FRONT YARD	BACK YARD	OTHER
Sunnycove Dr.	lawn 450		
Sunnycove Dr.	lawn 300	lawn 370 garden 295	
Sunnycove Dr.	lawn 175		
Sunnycove Dr.	lawn 220	lawn 165	
Sunnycove Dr.	lawn 150	lawn 155 garden 105	
Sunnycove Dr.	lawn 95		
Sunnycove Dr.	lawn 130	lawn 125	
Sunnycove Dr.	lawn 150	lawn 71 garden 155	
Sunnycove Dr.	lawn 120	lawn 270 garden 280	
Sunnycove Dr.	lawn 88	lawn 190	
Sunnycove Dr.	lawn 110	lawn 110 garden 90	
Sunnycove Dr.	lawn 70		side lawn 91
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Venta Ave.	lawn 190	lawn 240	
Venta Ave.	lawn <u>585</u> (62)	garden 295	
Venta Ave.	boulevard <u>580</u> (42)	lawn <u>670</u>	
Venta Ave.	lawn 190	lawn 190	
Venta Ave.	lawn <u>675</u> (200)	garden 270	
Venta Ave.	boulevard <u>655</u>	lawn <u>685</u>	
Venta Ave.	lawn 79	garden <u>515</u>	
Venta Ave.	lawn 380	lawn 220	
Venta Ave.	boulevard <u>580</u>	garden 300	
Venta Ave.	lawn <u>500</u>	lawn <u>510</u>	
Venta Ave.	lawn 225		
Venta Ave.	lawn 370 (110)	lawn 560	
Venta Ave.	boulevard 340 (44)	lawn 225	
Venta Ave.	lawn 420	garden 275	
Venta Ave.	lawn 295	lawn 405 (190)	
Venta Ave.	boulevard <u>525</u> (93)	garden 290	
Venta Ave.	lawn 385 (22)	lawn 455	
Venta Ave.		lawn <u>530</u>	
Venta Ave.	lawn 365	garden 320	
Venta Ave.		lawn 160 (54)	
Venta Ave.	lawn 390	garden 125	
Venta Ave.	boulevard <u>585</u>	bed 38	
Venta Ave.	lawn <u>595</u> (24)	lawn 420	
Venta Ave.	boulevard <u>875</u> (15)	garden 180	
Venta Ave.	lawn 385	lawn 325	
Venta Ave.	lawn 61	garden 190	
Venta Ave.	boulevard <u>810</u> (8)	lawn <u>555</u>	
Venta Ave.	lawn 235	lawn 270	
Venta Ave.		garden 125	
			E side lawn 350
			W side lawn 490(24)

TABLE 1 (cont'd)

STREET	FRONT YARD	BACK YARD	OTHER
Venta Ave.	lawn 410	lawn 190 garden 165	
Venta Ave.	lawn 370	lawn 285	
Venta Ave.	lawn <u>615</u>	lawn 350	
Venta Ave.	lawn 315 boulevard <u>530</u> (30)	garden 190 lawn 380 (39)	

* Sampling depth was 0-5 cm for lawns, boulevards and other grassed areas;
0-15 cm for cultivated gardens.

* Concentrations exceeding the 500 $\mu\text{g/g}$ "upper limit of normal" guideline are underlined.

() numbers in parentheses refer to the corresponding lead concentration for the 15-20 cm depth

~ one replicate $\geq 500 \mu\text{g/g}$, mean < 500

n = new soil

o = original soil

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TABLE 2

Soil Lead Concentrations for Public and Publicly Accessible
Commercial/Industrial Properties in the Vicinity of
Tonolli Co. (Canada) Ltd., Mississauga, 1987

Location	Loc. Code	Soil Lead Concentration ($\mu\text{g/g}$)		
		Sampling Depth in cm (0-5)	(15-20)	(0-15)
Dixie Road				
GO Station, N of short grass field	01	250*		
GO Station, NE corner of field	02	50		
GO Station, SE corner of field	03	43		
GO Station, grass strip in SW corner	04	140		
GO Station, boulevard on W side	05	85		
SE corner of Dixie and Blundell intersection boulevard, W side at 2430 Dixie Rd.	06	470		
boulevard, W side, front entrance of "Tonolli Co."	07	9300	510	
boulevard, W side at Tonolli Road	08	4050		
boulevard, NE corner of "Samuel" property lawn, NE corner of "Samuel" property	09	39000		
boulevard, W side, 20 m S of Tonolli Road	10	13000		
lawn, NW section of "Samuel" front lawn	11	8400	160	
lawn, centre of "Samuel" front lawn	12	9250		
boulevard, W side opposite Caterpillar Road	13	1750		
lawn, SE corner of "Samuel" front lawn	14	1550		
lawn, SW corner of "Samuel" front lawn	15	2950		
lawn, SW corner of "Samuel" front lawn	16	1850		
boulevard, W side, S of service road entrance	17	1250	24	
lawn, front of 2276 Dixie Rd.	18	3600		
lawn, front of 2276 Dixie Rd.	19	1450	110	
boulevard, W side, N of Queensway	20	2900		
lawn, N of sidewalk, front of "BBC"	21	1200		
lawn, S of sidewalk, front of "BBC"	22	1400	100	
boulevard, E side at "BBC" entrance	23	6100		
boulevard, E side, NE corner "Grace" property	24	8000		
lawn, N section, "Grace" front lawn	25	2200		
lawn, centre section, "Grace" front lawn	26	1900	340	
boulevard, E side, 20 m N of Caterpillar Rd.	27	3000		
lawn, S section, "Grace" front lawn	28	1500		
lawn, N section, "BNI" front lawn	29	1650		
lawn, centre section, "BNI" front lawn	30	1500	560	
lawn, S section, "BNI" front lawn	31	1200		
vacant lot, "2251" Dixie Rd., W half	32	1950		
vacant lot, "2251" Dixie Rd., E half	33	2200		
boulevard, E side, at Hydro right-of-way	34	780		
Hydro right-of-way, 40 m E of Dixie Rd.	35	185	32	
Hydro right-of-way, 200 m E of Dixie Rd.	36	200		
boulevard, E side, behind 1423 Safeway Cres.	37	1300		
boulevard, E side, behind 1397 Safeway Cres.	38	1300	400	
boulevard, E side, 30 m N of Sherway Dr.	39	1900		

TABLE 2 (Cont'd)

Location	Loc. Code	Soil Lead Concentration (µg/g)		
		Sampling Depth in cm (0-5)	(15-20)	(0-15)
Queensway East				
boulevard, SE corner Queensway and Stanfield Rd.	40	205*		
orchard, N side, SW section	41	400*		
orchard, N side, SE section	42	255*		
orchard, N side, NE section	43	200	73	
boulevard, N side, 5th lamp pole W of Dixie Rd.	44	555		
boulevard, N side, 3rd lamp pole W of Dixie Rd.	45	965		
boulevard, N side, 1st lamp pole W of Dixie Rd.	46	330		
boulevard, centre of roadway, E of Hydro tower	47	2350		
field, E of "BNI"	48	1250		
boulevard, N side, W of "Finlayson" building	49	590		
boulevard, centre of roadway, E of Hydro tower	50	590		
boulevard, N side, W end of "Caterpillar"	51	135	16	
boulevard, N side, middle section of "Caterpillar"	52	445		
boulevard, centre of roadway, E of Hydro tower	53	515		
boulevard, N side, 30 m E of "Caterpillar"	54	240		
field, W of "Caterpillar", 60 m N of road	55	101		
boulevard, N side, 100 m E of "Caterpillar"	56	220		
boulevard, N side, opposite Greenhurst Drive	57	315		
Stanfield Road				
side yard, S side 2351 Stanfield Rd.	58	90		
lawn, between "Aluminart" and "Revlon"	59	70		
along fence, NE corner of commercial mall	60	106		
along fence, NW corner of commercial mall	61	87		
Hydro right-of-way, at Stanfield Rd.	62	53*		
Blundell Road				
field, between 1224 Dundas St. and Blundell Rd.	63	46		
field, as above but approximately 100 m S	64	42		
soil strip, behind 1224 Dundas St., at railway	65	310		
boulevard at end of Blundell Rd.	66	110		
soil strip, N of railway embankment	67	335**		
boulevard, S side, front of 1314 Blundell Rd.	68	130	43	
soil strip, N of railway, 100 m W of Dixie	69	685		
grassed area, rear of 1331 Blundell Rd.	70	88		
boulevard, N side, opposite 1364 Blundell Rd.	71	98		

TABLE 2 (Cont'd)

Location	Loc. Code	Soil Lead Concentration ($\mu\text{g/g}$)		
		Sampling Depth in cm (0-5)	(15-20)	(0-15)
Tonolli Road				
cultivated field, N section	72			135
cultivated field, centre section	73			120
cultivated field, S section	74			155
field, near Tonolli Road, S of laneway	75	925		
field, near Tonolli Road, W of parking area	76	2300		
soil piles, N edge of parking area	77			1300
ditch, S side of laneway, W of "Tonolli Co."	78	500		
field, W of "Tonolli Co." fence, near lane	79	1650		
field, S of parking area, near road	80	4750		
boulevard, S side, corner of "Samuel" building	81	1500		
boulevard, N side, along wall at "Tonolli Co."	82	360		
boulevard, S side, off NE corner "Samuel" building	83	4050		
boulevard, N side, opposite "Samuel" transformer	84	35000		
Caterpillar Road				
boulevard/ditch, N side, S of "Grace"	85	1600		
boulevard/ditch, N side, SE corner "Grace"	86	775		
field, N of Caterpillar Road, E of "Grace"	87	225		
parking lot, E of "BBC"	88	980**		
field, E of "BBC", near apple tree	89	400		
field, E of "Caterpillar", at stream	90	175*		
Venta Avenue				
boulevard, S side, 50 m E of Dixie Rd.	91	435	45	
boulevard, S side, opposite Denise Road	92	455		
Sherway Drive				
Islamic Public School, playing field lawn	93	240		
Islamic Public School, slides area	94	35		
Islamic Public School, horse swings area	95	24		

* 1985 data

** 0-2 cm sampling depth

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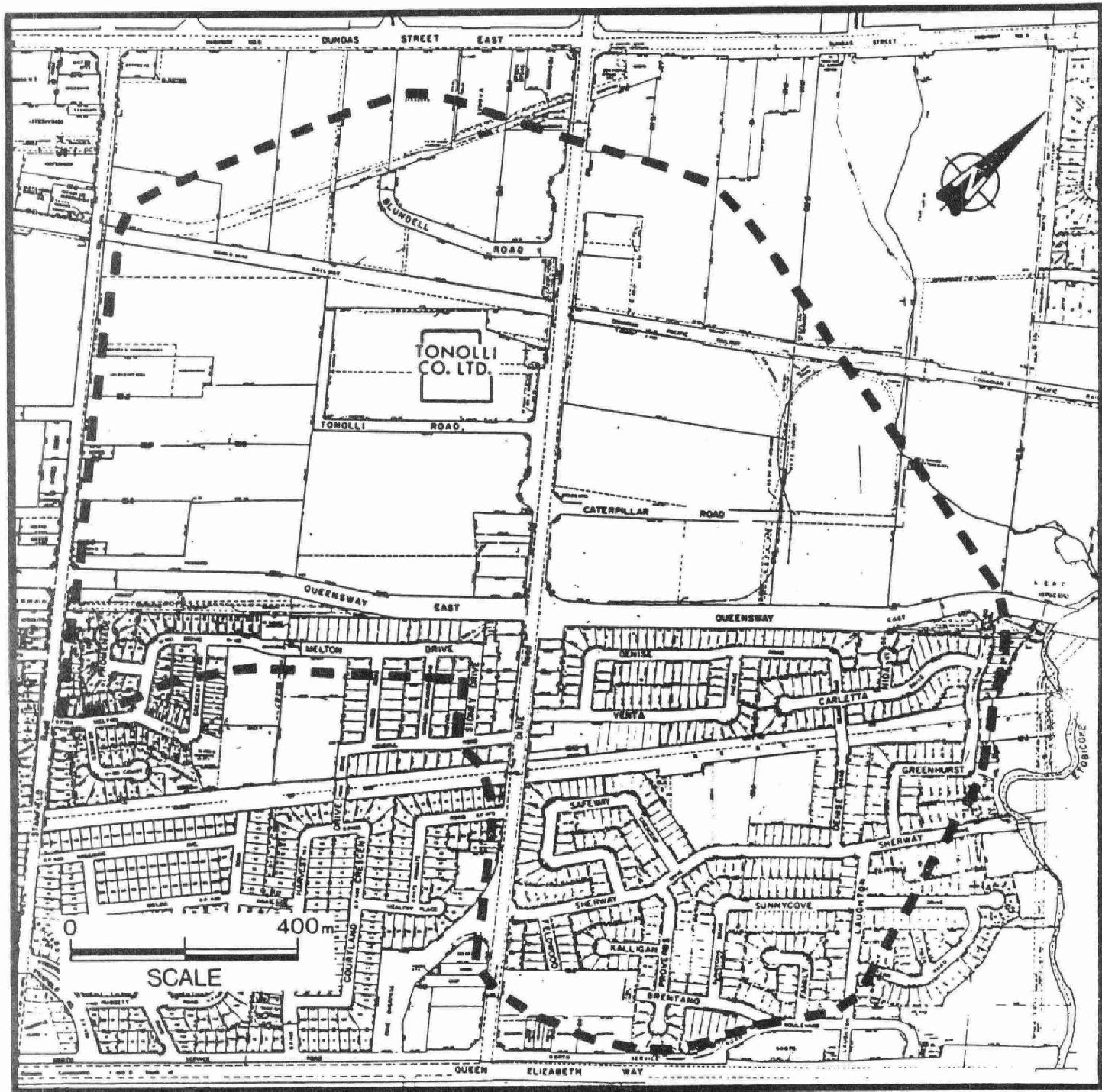


Figure 1 - Area from which soil samples were taken in the vicinity of Tonolli Co. of Canada Ltd., Mississauga, 1987.

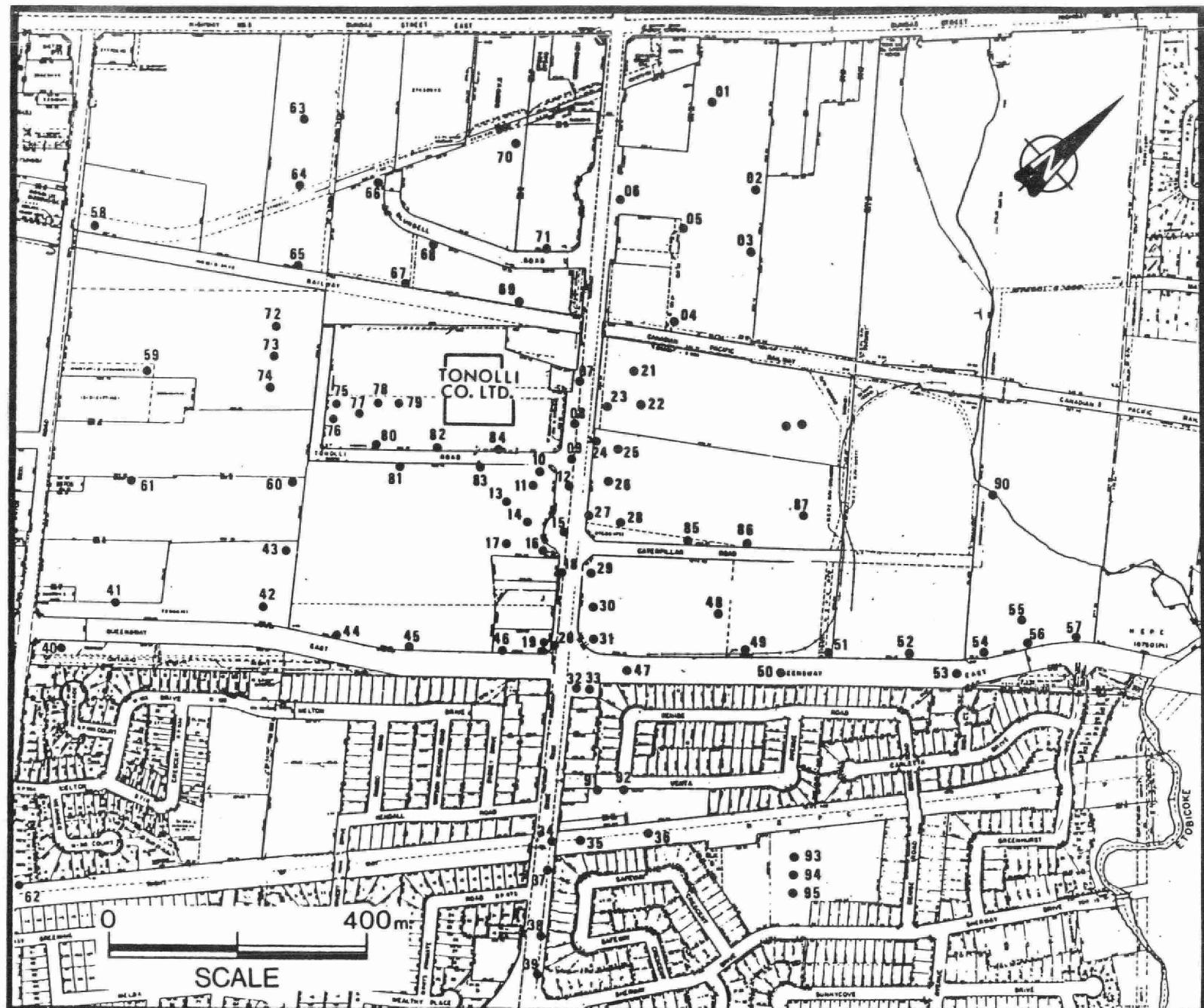


Figure 2 - Location of soil sampling sites on public and publicly accessible commercial properties in the vicinity of Tonolli Co. of Canada Ltd., Mississauga, 1987.

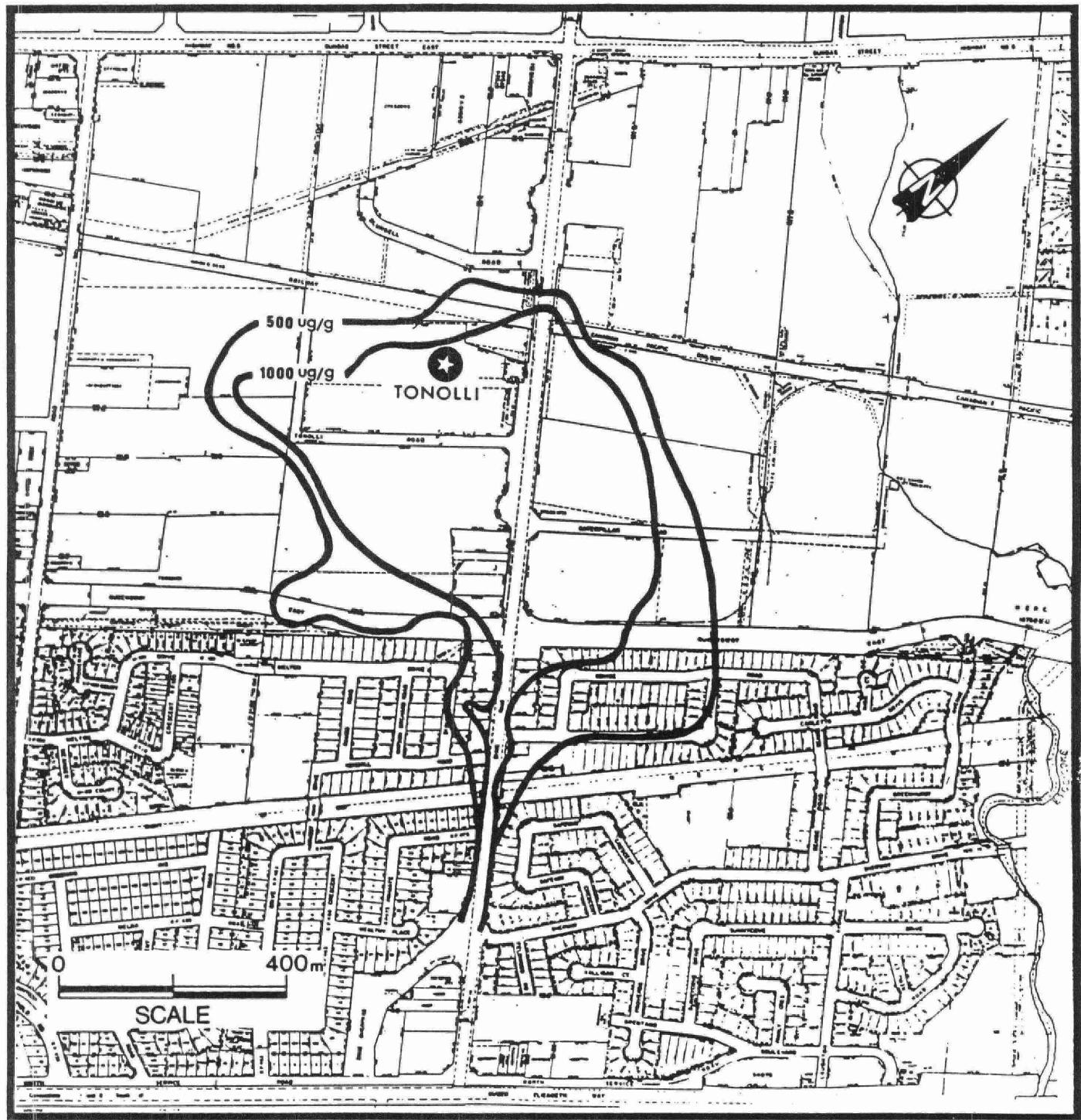
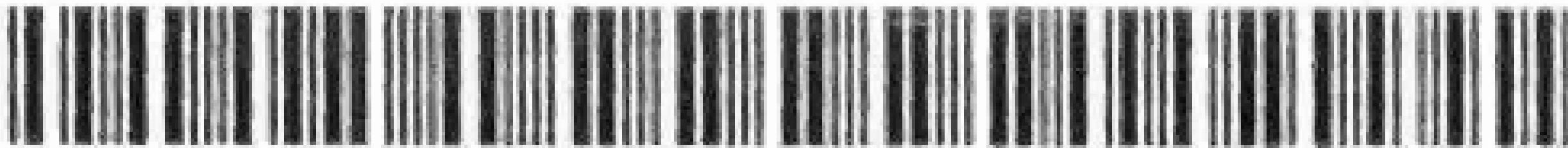


Figure 3 - Contour map of lead concentrations in surface soil (0-5 cm depth) in the vicinity of Tonolli Co. of Canada, Mississauga, 1987.



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